ABSTRACT

Electron focussing apparatus includes a cathode plate defining an impact surface on which particles impact, which surface has a finite probability of generating at least one electron for each impacting particle having predetermined characteristics. The apparatus also has an electron receiving element, and respective means for generating electrostatic and magnetic fields in a space extending from the impact surface to the electron receiving element. The means for generating the electrostatic and magnetic fields are configured whereby the E/B^2 ratio adjacent the electron receiving element is smaller than adjacent the impact surface, whereby to decrease the radius of curvature of the electron trajectories adjacent the electron receiving element relative to adjacent the impact surface and to thereby focus the electron trajectories in at least one dimension. In another aspect the electron receiving element is positioned and the means for generating the electrostatic and magnetic fields are configured to cause the electrons to deflect on average through greater than 180° before impacting the electron receiving element, whereby to focus, in at least one dimension, multiple electrons generated from any given area of the impact surface to a smaller area at the electron receiving element.